Having described the invention as above, we claim:

1. A glass composite comprising:

a first phosphate glass surface;

a second phosphate glass surface; and

between and in contact with said surfaces, a phosphorus-containing solution.

2. A glass composite as claimed in claim 1, wherein the phosphorus-containing solution is an aqueous solution.

3. A glass composite as claimed in claim 1, wherein the phosphorus-containing solution is an aqueous solution of phosphoric acid.

4. A glass composite as claimed in claim 3, wherein the aqueous solution of phosphoric acid contains phosphorus equivalent to an amount of from 0.1 to 85 weight % of P_2O_5.

5. A glass composite as claimed in claim 4, wherein the aqueous solution of phosphoric acid contains phosphorus equivalent to an amount of from 0.1 to 30 weight % of P_2O_5.

6. A glass composite as claimed in claim 5, wherein the aqueous solution of phosphoric acid contains phosphorus equivalent to an amount of from 0.1 to 20 weight % of P_2O_5.

7. A glass composite as claimed in claim 6, wherein the aqueous solution of phosphoric acid contains phosphorus equivalent to an amount of from 10-20 weight % of P_2O_5.

8. A glass composite as claimed in claim 1, wherein the solution is acidic.

9. A glass composite as claimed in claim 1, wherein the solution is basic.

10. A glass composite as claimed in claim 9, wherein the solution contains alkali or alkaline earth elements.

11. A glass composite as claimed in claim 8, wherein the solution contains phosphoric acid.

12. A glass composite as claimed in claim 1, wherein the solution comprises:

water in an amount of from about 15-99.9 weight %,

phosphorus in an amount equivalent to about 0.1-85 weight % P_2O_5.

13. A glass composite as claimed in claim 11, wherein the solution comprises

water in an amount of from about 50-90 weight %,

phosphorus in an amount equivalent to about 5-35 weight % P_2O_5,

Na_2O in a amount of from about 1-20 weight %,

K_2O in an amount of from about 1-20 weight %,

Al_2O_3 in an amount of from about 0-5 weight %, and

SiO_2 in an amount of from about 0-15 weight %.

14. A glass composite as claimed in claim 11, wherein the solution comprises

water in an amount of from about 70-90 weight %,

phosphorus in an amount equivalent to about 10-30 weight % P_2O_5,

Na_2O in a amount of from about 1-20 weight %, and

SiO_2 in an amount of from about 0-8 weight %.

15. A glass composite comprising:

a first phosphate glass interface;

a second phosphate glass interface; and

between and in contact with said interface, a layer comprising a cured phosphorus containing solution.

16. A glass composite comprising:

a first phosphate glass interface;

a second phosphate glass interface; and

between and in contact with said interface, a condensed phosphate layer that links the two interfaces.

17. A glass composite as claimed in claim 16, wherein the condensed phosphate layer is a (P-O-P) layer.

18. A glass composite prepared by joining two phosphate glass substrates together by curing therebetween a phosphorus-containing aqueous solution.

19. A method of bonding two phosphate glass surfaces comprising curing therebetween a phosphorus–containing aqueous solution.

20. A method as claimed in claim 19, further comprising a subsequent heat treatment.

21. A method as claimed in claim 20, wherein the heat treatment occurs at a temperature below the glass transition temperature of each phosphate glass surface.

22. A method as claimed in claim 20, wherein the heat treatment occurs at a temperature of from about 60°C to about 550°C.

23. A method as claimed in claim 22, wherein the heat treatment occurs at a temperature of from about 100° C to about 500° C.

24. A method as claimed in claim 23, wherein the heat treatment occurs at a temperature of from about 200° C to about 400° C.

25. A method as claimed in claim 24, wherein the heat treatment occurs at a temperature of from about 350° C to about 400° C.

26. A method as claimed in claim 19, wherein the curing is conducted for at least three days followed by a heat treatment.

27. A method as claimed in claim 19, wherein the curing is conducted for about a week.

28. A method as claimed in claim 27, wherein the curing is followed by a heat treatment.

29. A method as claimed in claim 19, wherein the two phosphate glass surfaces each have surface features equal to or less than 200 nm in height.

30. A method as claimed in claim 29, wherein the two phosphate glass surfaces are each polished.

31. A process for the formation of a phosphate-based glass composite, comprising:

providing a first phosphate-based glass having a first surface and a second phosphate-based glass having a second surface,

processing said first and second phosphate-based glass surfaces to provide a bonding surface,

providing a solution containing a phosphorus compound,

applying said phosphorus compound containing solution to at least one of said first and second phosphate-based glass surfaces,

placing said first surface into contact with said second surface, and

retaining said surfaces in contact until said surfaces are joined together while the composite cures.

32. A process as claimed in claim 31, further comprising heating the joined surfaces to a temperature below the glass transition temperature of the first or second phosphate-based glass surface.

33. A process as claimed in claim 31, wherein a vacuum is applied while the composite cures.

34. A process as claimed in claim 31, wherein the process is conducted at about room temperature.

35. A process as claimed in claim 31, wherein said step of processing said first and second phosphate-based glass surfaces comprises grinding or polishing.

36. A process as claimed in claim 35, wherein the resulting surface has a surface feature of less than 200 nm.

37. A process as claimed in claim 31, further comprising, after the step of processing, cleaning said first and second processed surfaces.

38. A process as claimed in claim 31, wherein pressure is applied to the phosphate-based glass surfaces.

39. A process as claimed in claim 31, wherein the temperature of the phosphate-based glass surfaces is gradually raised during the step of retaining.

40. In a photonic device comprising a phosphate glass component, the improvement wherein said phosphate glass component is a glass composite of claim 2.

41. A photonic device as claimed in claim 40, wherein the photonic device is a multiple-wavelength laser array.

42 . A photonic device as claimed in claim 41, wherein the photonic device is a low-loss splitting device.

43. A photonic device as claimed in claim 42, wherein the photonic device is a self-cooling laser.

44. A phosphate glass having a phosphorus treated surface, comprising

a phosphate glass substrate, said phosphate glass substrate having a surface feature of less than about 200 nm, and

a layer of phosphorus-containing solution applied thereto.

45. A phosphate glass as claimed in claim 44, further comprising a ceramic sandwiching the phosphorus-containing solution.

46. A phosphate glass as claimed in claim 44, further comprising a non-phosphate glass sandwiching the phosphorus-containing solution.